

# TikZ Cheat Sheet

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## Coordinate Specifications

$(x,y)$	Cartesian coordinates	library needed
$(\theta:r)$	polar coordinates	
$(\$ (A) + \{\sin(60)\}*(B) \$)$	coordinate calculations	calc
$(\$ (A)!.25!(B) \$)$	partway calculations	calc
$(\$ (A)!3cm!(B) \$)$	3cm from (A) in direction of (B)	calc
$(\$ (A)!1.2!30:(B) \$)$	stretch by 1.2, then rotate by $30^\circ$	calc
$(\$ (A)!(B)!(C) \$)$	projection of point $B$ onto line $\overline{AC}$	calc
$(\$ (A)!(B)!30:(C) \$)$	project $B$ onto line $\overline{AC}$ , then rotate by $30^\circ$	calc
<code>\node[above=1cm of somenode.north]</code>	position new node 1cm above existing anchor	positioning

## General




`\coordinate (X) at (3,5);`      name a point  $X$   
`\node[options] (X) at (3,5) {};`    place a node and name it  $X$

## Paths



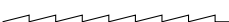





<code>\path (A) rectangle (B);</code>	rectangle
<code>\path (A) -- (B);</code>	line
<code>\path (A) -- (B) (C) -- (D);</code>	move from (B) to (C) without drawing
<code>\path (A) circle (4);</code>	circle of radius 4
<code>\path (A) ellipse(3 and 2);</code>	ellipse of width 6 and height 4
<code>\path (A) arc(<math>\theta_1:\theta_2:r</math>) (B);</code>	circular arc of radius $r$ from angle $\theta_1$ to $\theta_2$
<code>\path (A) arc(<math>\theta_1:\theta_2:r_1</math> and <math>r_2</math>) (B);</code>	elliptical arc
<code>\path (A) .. controls (C1) and (C2) .. (B);</code>	Bézier curve
<code>\path (A) grid (B);</code>	a grid
<code>\path (A) parabola (B);</code>	options: <b>step</b> , <b>xstep</b> , <b>ystep</b> , <b>helplines</b> parabola (several options for bending)
<code>\path (A) sin (B);</code>	sine curve from $(0,0)$ to $(\pi/2,1)$
<code>\path (A) cos (B);</code>	cosine curve from $(0,0)$ to $(\pi/2,1)$
<code>-- cycle</code>	return to start and join up nicely

## Path Options

`[rounded corners]`, `[rounded corners=10pt]`    smooth all corners in the path  
`[loop]`

Path widths	Path dashing	Arrowheads
<code>[ultra thin]</code>	<code>[solid]</code>	<code>[-stealth]</code> 
<code>[very thin]</code>	<code>[dotted]</code>	<code>[-latex]</code> 
<code>[thin]</code>	<code>[densely dotted]</code>	<code>[-to]</code> 
<code>[semithick]</code>	<code>[loosely dotted]</code>	
<code>[thick]</code>	<code>[dashed]</code>	
<code>[very thick]</code>	<code>[densely dashed]</code>	
<code>[ultra thick]</code>	<code>[loosely dashed]</code>	

## Path Decorations

straight zigzag		<code>decorations.pathmorphing</code>
random steps		<code>decorations.pathmorphing</code>
saw		<code>decorations.pathmorphing</code>
zigzag		<code>decorations.pathmorphing</code>
bent		<code>decorations.pathmorphing</code>
bumps		<code>decorations.pathmorphing</code>
coil		<code>decorations.pathmorphing</code>
snake		<code>decorations.pathmorphing</code>

## Let-operations










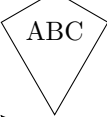
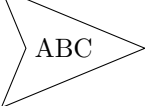
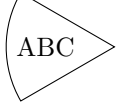
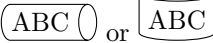










<code>\path ... let \p1 = (\$ (B)-(A) \$) in ...</code>	save a point's coordinates
<code>... \x1</code>	<i>x</i> -coordinate of point <code>\p1</code>
<code>... \y1</code>	<i>y</i> -coordinate of point <code>\p1</code>
<code>... \p1</code>	string containing coordinates of <code>\p1</code>
<code>... {veclen(\x1,\y1)}</code>	length of vector $(x,y)$
<code>\path ... let \n1 = {sin(60)} in ...</code>	save a number

## Layers

```
\pgfdeclarelayer{background}
\pgfdeclarelayer{foreground}
\pgfsetlayers{background,main,foreground}

\begin{pgfonlayer}{background}
  \node {This node will appear on the background layer.};
\end{pgfonlayer}
```

## Node Shapes

		library needed
circle		
rectangle		
coordinate		
diamond		<code>shapes.geometric</code>
ellipse		<code>shapes.geometric</code>
trapezium		<code>shapes.geometric</code>
semicircle		<code>shapes.geometric</code>
regular polygon		<code>shapes.geometric</code>
star		<code>shapes.geometric</code>
isosceles triangle		<code>shapes.geometric</code>
kite		<code>shapes.geometric</code>
dart		<code>shapes.geometric</code>
circular sector		<code>shapes.geometric</code>
cylinder	 or 	<code>shapes.geometric</code>
forbidden sign		<code>shapes.symbols</code>
cloud		<code>shapes.symbols</code>
starburst		<code>shapes.symbols</code>
signal		<code>shapes.symbols</code>
tape		<code>shapes.symbols</code>
cross out		<code>shapes.misc</code>
strike out		<code>shapes.misc</code>
rounded rectangle		<code>shapes.misc</code>
chamfered rectangle		<code>shapes.misc</code>